

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 April 2001 (12.04.2001)

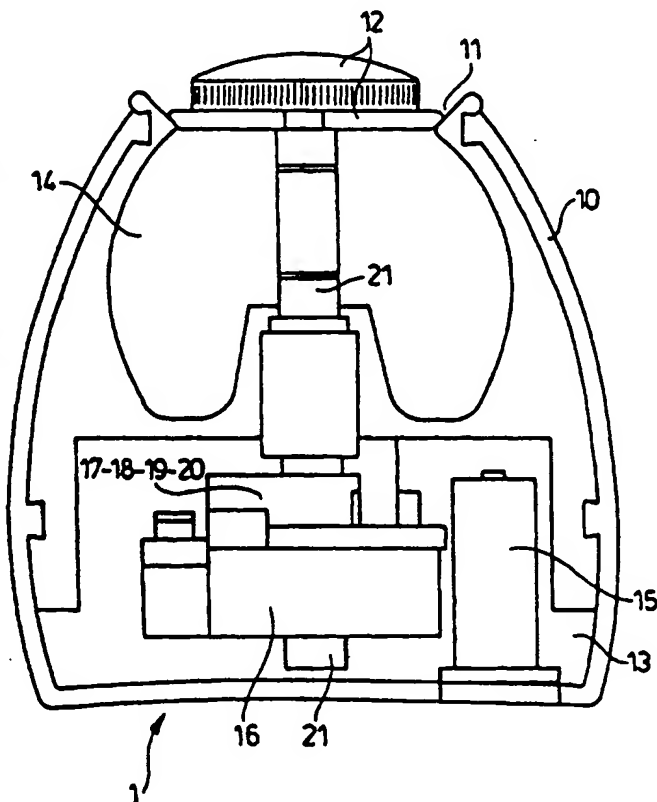
PCT

(10) International Publication Number
WO 01/25527 A1

- (51) International Patent Classification⁷: D06F 39/02, A47L 15/44
- (21) International Application Number: PCT/US00/27016
- (22) International Filing Date:
29 September 2000 (29.09.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
99870204.7 1 October 1999 (01.10.1999) EP
- (71) Applicant (for all designated States except US): THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US).
- (72) Inventors; and
(75) Inventors/Applicants (for US only): DAVENET, Dorothee, Helene [FR/BE]; Rue Uyttenhove, 21, B-1090 Bruxelles (BE). AZZANI, Jean-Luc [FR/IT]; Via F. Busoni, 3, I-00124 Rome (IT). BARRON, Bradford, Scott [US/BE]; Neerhoflaan 35, B-1780 Wemmel (BE). DAY, Todd, Mitchell [US/US]; 12275 Fite Road, Bethel, OH 45106 (US). DIAMANTI, Luca [IT/IT]; Via Zignago, 22, I-00166 Roma (IT). SMITH, Christopher, Lawrence [US/US]; 6221 Summerville Lane, Liberty Township, OH 45011 (US).
- (74) Agents: REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217-1087 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility

[Continued on next page]

(54) Title: A SMART DOSING DISPENSER



(57) Abstract: The present invention is directed to a portable, self-contained, device for dosing and/or dispensing at least one product into an appliance for treating laundry or dishes, said device comprising a housing with at least one compartment for containing said at least one product, said at least one compartment being closed by at least one corresponding cover, the device being characterized in that said device comprises at least one means for storing energy and releasing it, such that said product is released at one or more predetermined point(s) in time during the wash cycle. Preferably, said means is a battery, more preferably a rechargeable battery. Also preferably, said device comprises at least one sensor and/or at least one actuator for detecting when the wash conditions are optimal and open at least one of said at least one compartments for releasing a product.

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model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KR (utility model), KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— *With international search report.*

- (84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A SMART DOSING DISPENSER

Field of the invention

The present invention relates to devices for dosing treatment compositions to be released into a medium, in particular those required for use in fabric and home care.

Background of the invention

Dosing devices for dosing treatment compositions in a dish or laundry washing machine are representative of the various dosing devices to which the present invention can apply. Typically, such dosing devices comprise at least one compartment which is filled with product by the consumer, and at least one opening which is such that said product is mixed with wash water during a wash cycle. Such dosing devices are interesting because the compartment is usually designed such that it contains substantially the amount of product necessary for one wash cycle. So the dosing device allows for dosing and direct release of the product onto the items to be treated. Such dosing devices are usually re-usable.

A lot of improvements have been brought to dosing devices through the years, all directed to a better dosing and/or release the product during the wash. Especially, it was seen as an important feature that the release of the product may be delayed, for example till the last phase of the wash cycle.

Some dosing devices comprise more than one compartment. Typically this type of devices are used for products that are incompatible, but which must be added in the same wash water, for example in EP.0.236136 A1 to Unilever.

Some other devices comprise a means for releasing their contents progressively during the wash cycle, or even at some point in time during the wash, for example at the spin drying phase or during the last rinse. In case the

release needs to be progressive, the device comprises for example vents shaped as restricted openings, for example in US.4.703.872 to Procter and Gamble. In case the release needs to be delayed in the wash cycle, the device comprises mechanical means, for example it uses temperature of the wash water, and the difference of retraction properties of its constitutive materials: for example US.5.768.918 discloses a device comprising a main compartment and a cover to releasably close said compartment, both made out of two different materials. Before the wash, the user fills the device and closes the compartment with the cover. During the wash, at the time the temperature of the wash water changes, typically during the last rinse, the retraction of the cover is more important than the retraction of the compartment's material, such that said cover slides open from said compartment, thereby releasing the contents. Another means used for release product at one point in time during the wash is the use of the centrifugal force at the time of the spin drying. Devices using a compartment releasably closed with a cover that is closed by the user before the wash and then opened by the centrifugal force is for example disclosed in US.3.888.391 to Procter and Gamble.

Other embodiments were found to improve the release of the product at one point in time during the wash, for example the use of porous membranes, for example as disclosed in EP.0.236136 A1.

The dosing devices which can be found in the art solve some issues. However, it appears that in some cases, the conditions in the wash water change from one wash cycle to another, when using the same washing machine. Such conditions depend on the amount of items to be washed, the nature and amount of product that is used, the water hardness, and other parameters. So one main disadvantage is that the opening of the dosing device and release of the product cannot be pre-determined, but depends only on wash water characteristics, which are likely to vary from one wash cycle to another.

It is therefore one main object of the present invention to provide the user with a dosing device which is portable and self contained, so that it can be used for in-house applications, which comprises a means to release the device's contents at a predetermined moment of the wash cycle. In addition, it is an object of the present invention to provide a device that allows to release products that could not be released by a washing machine.

Summary of the invention

The present invention is directed to a portable, self-contained, device for dosing and/or dispensing at least one product into an appliance for treating laundry or dishes, said device comprising a housing with at least one compartment for containing said at least one product, said at least one compartment being closed by at least one corresponding cover, the device being characterized in that said device comprises at least one means for storing energy and releasing it, such that said product is released at one or more predetermined point(s) in time during the wash cycle.

Preferably, said means is a battery, more preferably a rechargeable battery. Also preferably, said device comprises at least one sensor and/or at least one actuator for detecting when the wash conditions are optimal and open at least one of said at least one compartment for releasing a product.

Brief description of the drawings

The invention will now be explained in detail with reference to the accompanying drawings, in which:

- Figure 1 is a profile cut view of a dosing device according to the present invention, in the closed position, with cover positioned for opening towards the outside of the device.

- Figure 2 is a profile cut view of a dosing device according to the present invention in the open position, with cover positioned for opening towards the inside of the device.

- Figure 3 is a profile cut view with the housing, cover and plunger rod of a dosing device according to the present invention.

- Figures 4 and 5 are profile views showing various embodiments of the actuator.

- Figures 6 A, B, C and D are schematic views showing various embodiments of the locking mechanism for securing the dosing device in closed position.

Detailed description of the invention

As per figures 1, 2 and 3, the dosing device (1) of the present invention comprises a housing (10) with at least one opening (11). Said opening (11) is removably closed by a cover (12). Inside the housing (10), the dosing device (1) comprises at least one compartment for the electromechanical components, and at least one other product compartment (14) for filling with the product to dose and dispense. Said at least one product compartment (14) can have any suitable shape, such that once the dosing device (1) is opened, the release of its contents is easy and complete (even if progressive). While the dosing device (1) can have any suitable shape, in one embodiment it is made out of two hemispheres, one comprising at least one product compartment (14) for containing at least one product to be released, and the other hemisphere comprising an electromechanical compartment (13) containing the power supply, at least one sensor (16), actuator systems (17), and a microchip (18) for driving a logic control program.

The dosing device (1) according to the present invention is primarily suitable for dosing any type of product that is used for treatment of items. Preferably it is for dosing products for use in fabric and dish care, more

preferably detergent compositions. Products suitable for use with the dosing device (1) of the present inventions include but are not limited to: laundry detergents and additives, bleach-based products, hypochlorite-based products, dishwashing compositions, perfumes, malodor removal compositions, fabric softeners, disinfectant, easy ironing, detergent boosters (enzymes)... The dosing device (1) of the present invention can have various uses that require release of treatment product into a medium, at one time or sequentially. Such uses include but are not limited to: dish-washing, hot air drying of fabrics or the like, release of body care products in a bathtub, release of shower gel or shampoo, release of light duty liquids in the sink for assisting hand dish washing, release of cleaning or perfuming products in the tank of toilets, etc.... In the following description, and for the sake of clarity, the example will be given of application of the dosing device (1) for treatment of fabrics in a laundry washing machine.

By dosing device (1), it is meant a device with which it is possible to measure the right amount of product to be released during a wash cycle, depending on the wash conditions, including but not limited to the amount of items to be washed, the composition of the washing environment (for instance the wash water), the nature of the product which is used for the wash...

In one preferred embodiment, the dosing is made by the user her/himself. For example, this can be done by using the size of the device's compartment to measure the right amount of product to be released in the wash. In this case, the device comprises a means, for example dosing line-up marks, that will help the user chose the right amount of product to fill in. Alternatively, the user can introduce a cartridge of product into the dosing device (1), said cartridge containing a predetermined amount of product, e.g. for one or several wash(es).

In another embodiment, the dosing is done by the device itself, which is constructed so that its at least one compartment can be opened and closed again during the wash. In this case, the compartment does not comprise line-up marks, the user fills it completely before the wash. During the wash, the dosing device (1) first opens to release product, then senses when the concentration of

product is sufficient and finally closes to prevent over-dosing of the product. In this case, the concentration sensing is done by a checking one component which is a characteristic of the product to be released, for example, the level of chlorine can be sensed, in case the product to be released is bleach. The skilled person will be able to determine which compound must be sensed, depending on which product is released. Of course, a corresponding and suitable sensor (16) must be integrated to the dosing device (1) in this case, and the control logic program must be adapted accordingly.

When closed, the dosing device (1) can be of any suitable shape, for example cubic, but it is preferably substantially spherical, and more preferably, it is designed such that once closed and ready to be placed in a washing machine, its overall surface is as smooth as possible, so that no sharp protrusion can damage the items which are being treated. Indeed, one possible use of the dosing device (1) of the present invention is the use for releasing fabric care products in a laundry washing machine, thus it is necessary that the device's surface be as smooth as possible so as not to tear the fabric during the wash, even when the device is open. In a preferred embodiment, the dosing device (1) comprises a means for making it stand on a flat surface, for example on a table. This means can be for example a flat portion of the housing (10)'s outside surface, or a stand. Alternatively, the electronic components of the dosing device (1), which are the heaviest part of said device are located in the bottom portion of said device, so that when the device is put on a flat surface, it always stays in the upright position.

Once open, the dosing device (1) most preferably stays into one whole part, so that the user does not have to remove more than one portion of the device from the washing machine's drum after the wash.

The materials used for the housing (10) and the cover (12) might be of any type, and they may be made out of one single or several materials. Preferred materials for the housing (10) and the cover (12) are synthetic materials, for

example plastic or rubber, so as to resist to liquids and or temperature variations. It is highly preferred that once closed, the dosing device be liquid-tight. Of course, all materials constitutive of the dosing device (1) will be chosen such that they resist to the conditions of use. Preferably, they are heat resistant so as to be used in the tumble of a clothes hot air dryer without damage, or into a dish-washing machine. Example of hard materials include but are not limited to polypropylene (PP), polycarbonate (PC), copolymers of butadiene and styrene, and the like.

The housing (10) and the cover (12) are preferably made by injection molding. In case they are made out of more than one material, co-injection molding process will be preferred, where applicable, since it is less expensive than molding several insert portions separately and then assemble them. For instance, co-injection molding can be used for the housing (10), to make it out of hard plastic, with some portions out of a non-slipping rubber material. It is preferred that at least some portions of the dosing device's outer surface (including housing (10) and cover (12)) are made out of a rubber like material, which will help to prevent noise from tumbling in the machine. Alternatively, in one embodiment of this invention, the dosing device (1) can be secured to the walls of the washing machine's drum, for example by means of a magnet. In this way, the noise due to the tumbling of said dosing device (1) inside the drum during the wash is canceled, or at least substantially reduced.

Alternatively, a rubber sleeve is fitted around the device's main body and cover (12).

It is an essential feature of the dosing device (1) of the present invention that it comprises at least one means for storing energy (15) and releasing it, such that the contents of said dosing device (1) is released at a given predetermined time during a wash cycle. It is highly preferred that the dosing device (1) also comprises at least one sensor (16) which is linked to the means, to determine when the environment, for example the wash water, requires that the dosing device (1) be opened and the product released. Also preferably, the dosing

laundry or dishes, by using a device according to claim 1, comprising the steps of:

- (i) filling said device with said at least one product;
- (ii) manually closing said device thereby loading the energy, switching it on;
- (iii) placing said device within said appliance together with items to be treated, and start said appliance for a treatment;
- (iv) taking said device out of said appliance together with the items once they have been treated.

The appliances in which the dosing device (1) is limited to vertical or horizontal laundry washing machines, machines, or hot air clothes dryers.

As previously explained, the dosing device (1) comprises a cover (12) before pushing on it to close said dosing device (1) comprises an electrical switch at the bottom (21) which closes the electrical circuit when the user presses to close the device and starts said device on. Also the switch is independent from the plunger rod (21) and cover (12) at the surface of the device's housing (10).

Claims

1. A portable, self-contained, device for dosing and/or dispensing at least one product into an appliance for treating laundry or dishes, said device comprising a housing with at least one compartment for containing said at least one product, said at least one compartment being closed by at least one corresponding cover, the device being characterized in that said device comprises at least one means for storing energy and releasing it, such that said product is released at one or more predetermined point(s) in time during the wash cycle.
2. A device according to any of the preceding claims, wherein one means to store and release energy is achieved by an electrical battery.
3. A device according to claim 2, wherein said electrical battery is rechargeable.
4. A device according to claims 2 or 3, which further comprises at least one actuator to open the cover of said at least one compartment.
5. A device according to claim 4, wherein said actuator is achieved by a mechanical actuator linked to the cover, said mechanical actuator being manually loaded with mechanical energy when the consumer presses the cover prior to placing said device into the washing machine, said mechanical energy being stored by locking the mechanical actuator in a loaded position through a locking means, said mechanical energy being released when said locking means is unlocked by an electromechanical actuator powered by the battery.
6. A device according to claim 5, wherein said mechanical actuator is a metallic coiled spring, said mechanical energy is spring compression

energy, said electromechanical actuator is a solenoid, and said locking means is achieved by: (a) a locking tooth located onto the movable plunger rod, into which (b) a shaft of the solenoid moves in/out to respectively lock/unlock said spring.

7. A device according to any of the preceding claims, which comprises at least one sensor, so as to analyze the composition of the environment of said device and determine when the actuator must open said at least one compartment.
8. A sensor for use in a dosing device according to any of the preceding claims, which is linked to the battery and/or the actuator.
9. A process of dosing and dispensing at least one product into an appliance for treating laundry or dishes, by using a device according to claims 1 to 7, the process comprising the steps of:
 - (i) filling said device with said at least one product;
 - (ii) manually closing said device, thereby loading the device with mechanical energy;
 - (iii) placing said device within said appliance together with the laundry or dishes items to be treated, and start said appliance for a treatment cycle;
 - (iv) taking said device out of said appliance together with the laundry or dishes, once they have been treated.

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Fig. 1

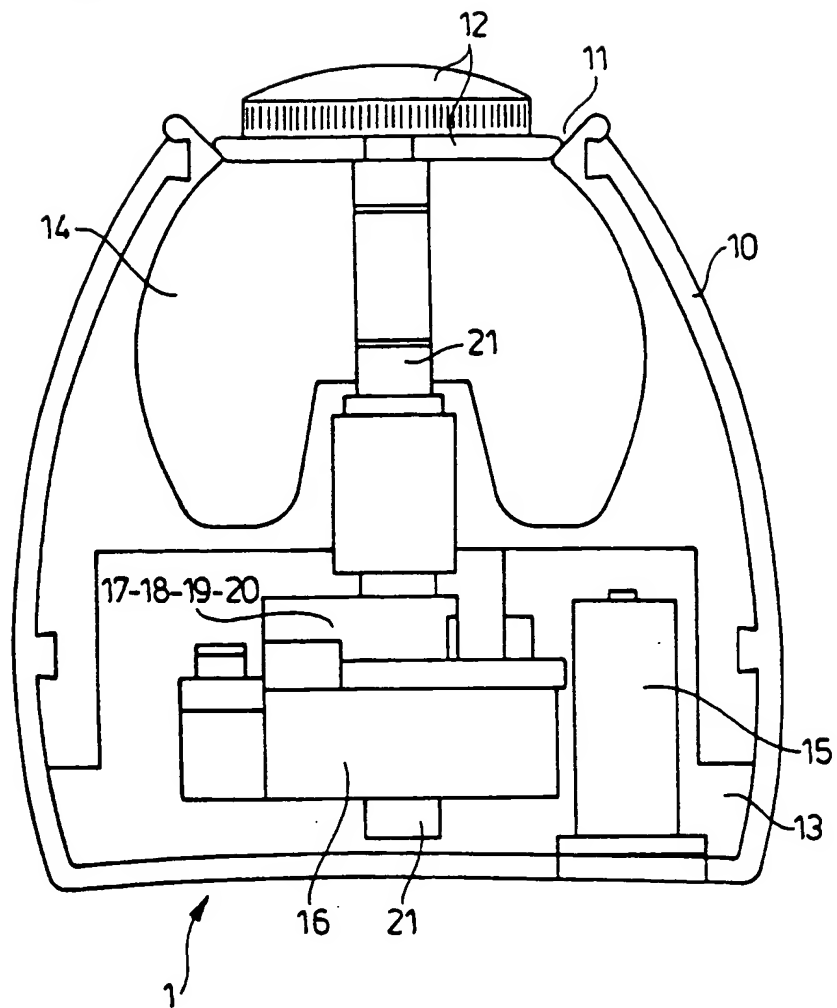
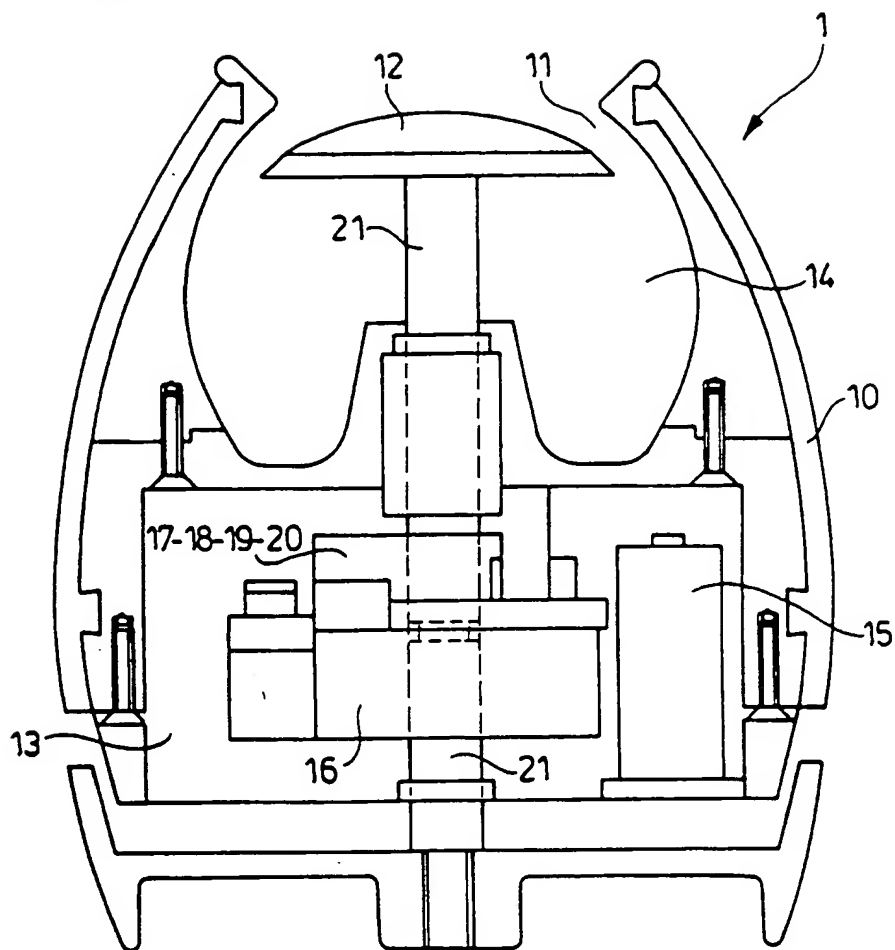
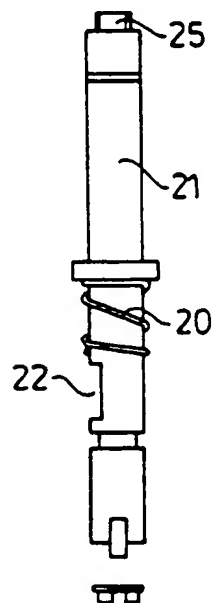
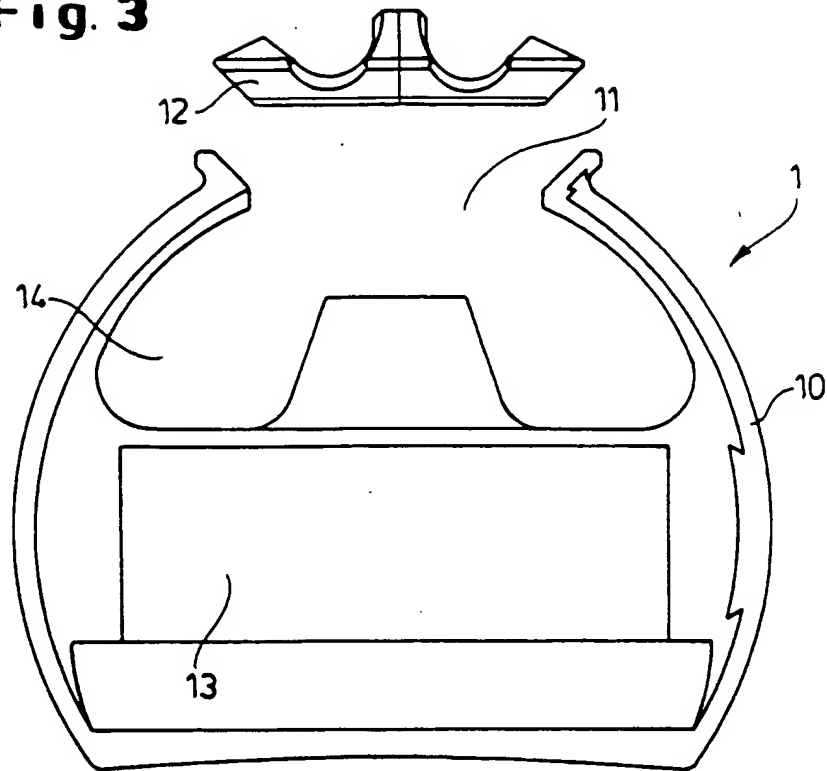


Fig. 2

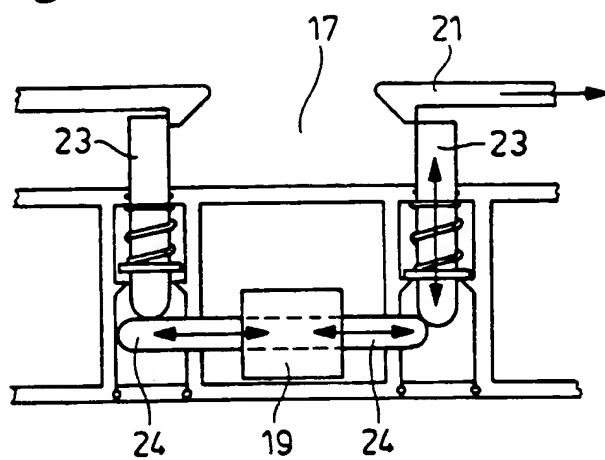
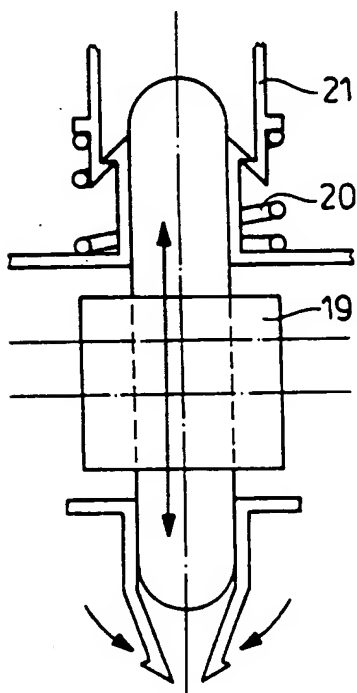


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Fig. 3

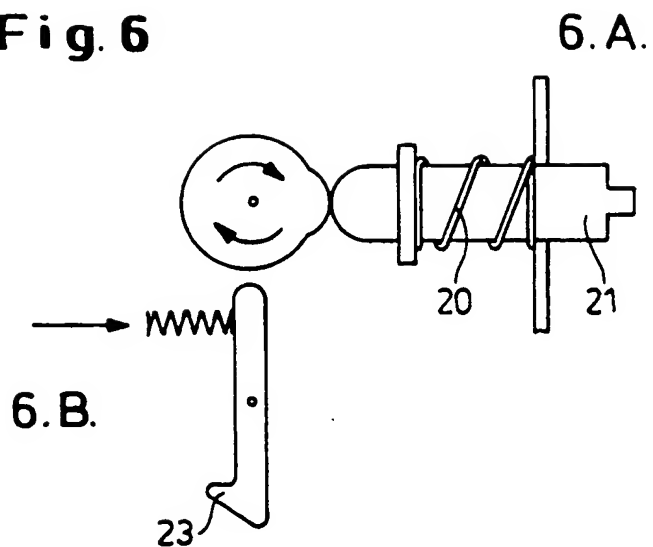


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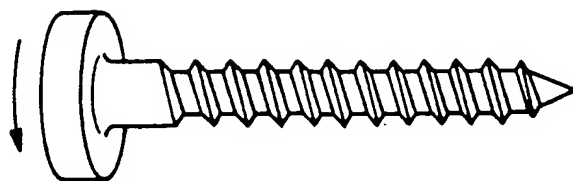
Fig. 4**Fig. 5**

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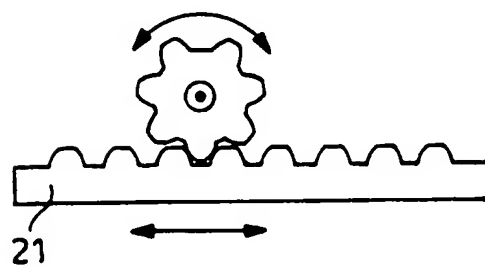
Fig. 6



6.C.



6.D.



INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 00/27016

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 D06F39/02 A47L15/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 D06F A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 09480 A (SCHUHWERK ROLAND) 13 March 1997 (1997-03-13) the whole document ---	1-4, 7-9
X	EP 0 432 319 A (SOAPTRONIC INC) 19 June 1991 (1991-06-19) the whole document ---	1-4, 9
A	US 5 697 230 A (SCHNEIDER GERHARD ET AL) 16 December 1997 (1997-12-16) the whole document ---	1
A	US 5 768 918 A (MCKIBBEN GARY E) 23 June 1998 (1998-06-23) the whole document ---	1
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *A* document member of the same patent family

Date of the actual completion of the international search

7 December 2000

Date of mailing of the international search report

15/12/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Norman, P

INTERNATIONAL SEARCH REPORT

Intern. Application No

PCT/US 00/27016

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 3 180 538 A (NISON M) 27 April 1965 (1965-04-27) the whole document</p>	1,5,6

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern. Application No

PCT/US 00/27016

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		GB 2324311 A	21-10-1998
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laundry or dishes, by using a device according to claims 1 to 7, the process comprising the steps of:

- (i) filling said device with said at least one product;
- (ii) manually closing said device thereby loading the device with mechanical energy, switching it on;
- (iii) placing said device within said appliance together with the laundry or dishes items to be treated, and start said appliance for a treatment cycle;
- (iv) taking said device out of said appliance together with the laundry or dishes, once they have been treated.

The appliances in which the dosing device (1) is used includes but is not limited to vertical or horizontal laundry washing machines, automatic dishwashing machines, or hot air clothes dryers.

As previously explained, the dosing device (1) can be started on by twisting the cover (12) before pushing on it to close said device. Alternatively, the dosing device (1) comprises an electrical switch at the bottom of the plunger rod (21) which closes the electrical circuit when the user presses onto the cover (12) to close the device and starts said device on. Also alternatively, the on/off switch is independent from the plunger rod (21) and cover (12), and is a switch located at the surface of the device's housing (10).

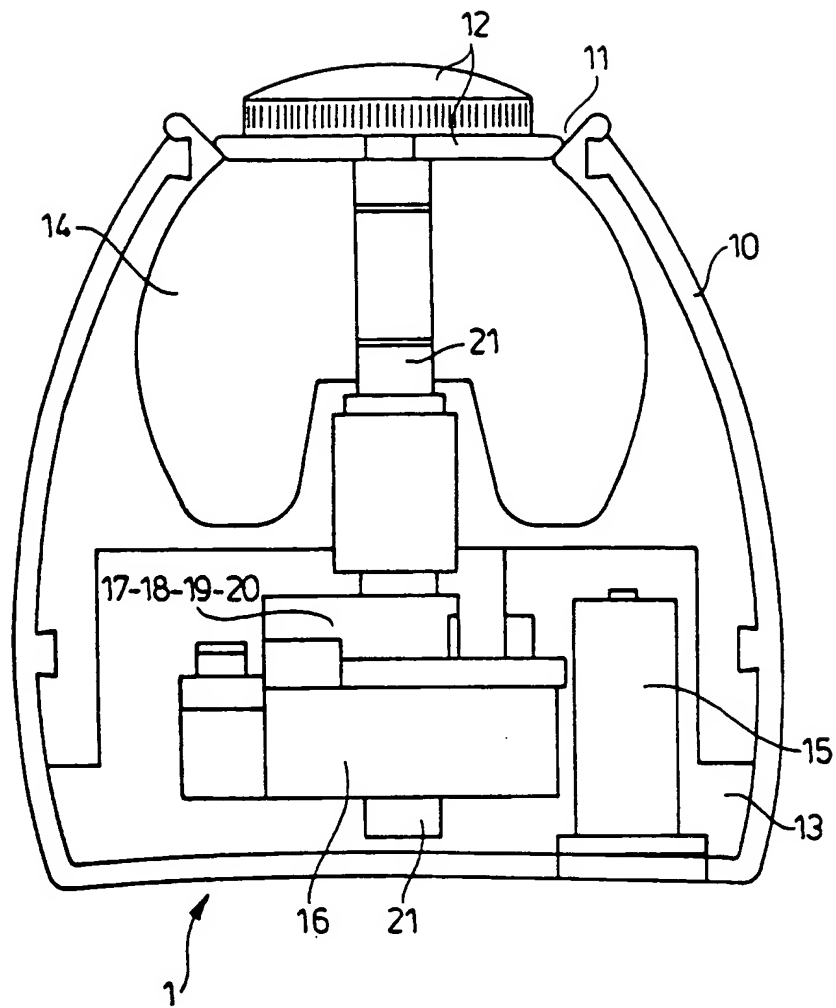
Claims

1. A portable, self-contained, device for dosing and/or dispensing at least one product into an appliance for treating laundry or dishes, said device comprising a housing with at least one compartment for containing said at least one product, said at least one compartment being closed by at least one corresponding cover, the device being characterized in that said device comprises at least one means for storing energy and releasing it, such that said product is released at one or more predetermined point(s) in time during the wash cycle.
2. A device according to any of the preceding claims, wherein one means to store and release energy is achieved by an electrical battery.
3. A device according to claim 2, wherein said electrical battery is rechargeable.
4. A device according to claims 2 or 3, which further comprises at least one actuator to open the cover of said at least one compartment.
5. A device according to claim 4, wherein said actuator is achieved by a mechanical actuator linked to the cover, said mechanical actuator being manually loaded with mechanical energy when the consumer presses the cover prior to placing said device into the washing machine, said mechanical energy being stored by locking the mechanical actuator in a loaded position through a locking means, said mechanical energy being released when said locking means is unlocked by an electromechanical actuator powered by the battery.
6. A device according to claim 5, wherein said mechanical actuator is a metallic coiled spring, said mechanical energy is spring compression

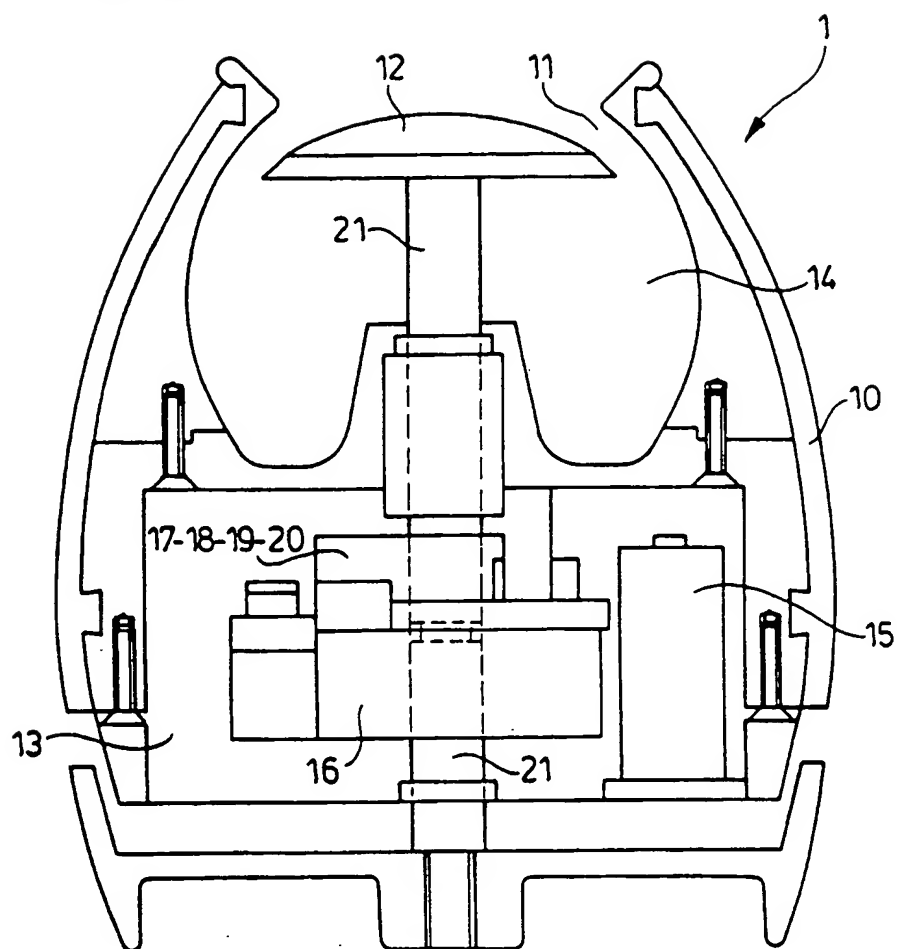
energy, said electromechanical actuator is a solenoid, and said locking means is achieved by: (a) a locking tooth located onto the movable plunger rod, into which (b) a shaft of the solenoid moves in/out to respectively lock/unlock said spring.

7. A device according to any of the preceding claims, which comprises at least one sensor, so as to analyze the composition of the environment of said device and determine when the actuator must open said at least one compartment.
8. A sensor for use in a dosing device according to any of the preceding claims, which is linked to the battery and/or the actuator.
9. A process of dosing and dispensing at least one product into an appliance for treating laundry or dishes, by using a device according to claims 1 to 7, the process comprising the steps of:
 - (i) filling said device with said at least one product;
 - (ii) manually closing said device, thereby loading the device with mechanical energy;
 - (iii) placing said device within said appliance together with the laundry or dishes items to be treated, and start said appliance for a treatment cycle;
 - (iv) taking said device out of said appliance together with the laundry or dishes, once they have been treated.

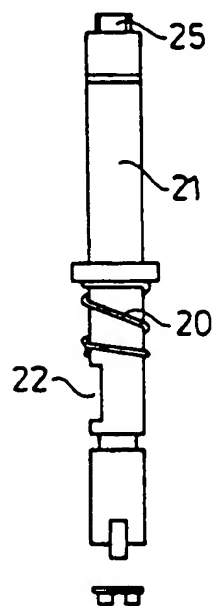
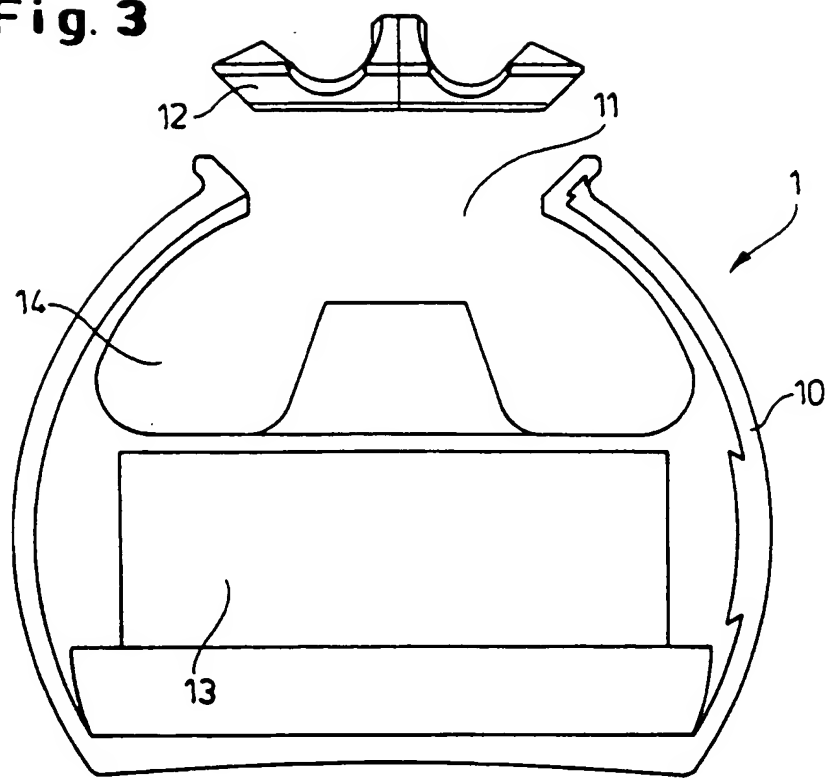
- 1 / 5 -

Fig. 1

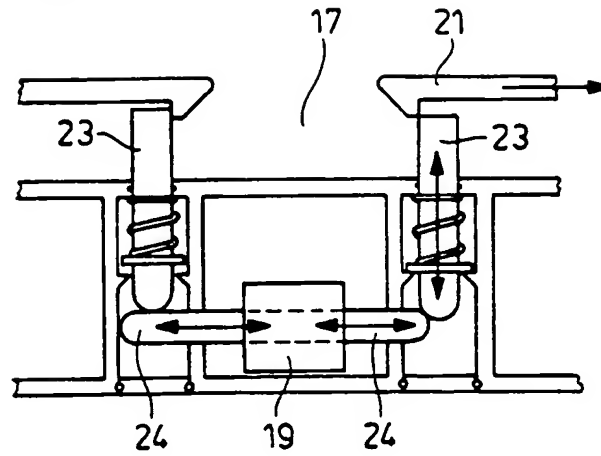
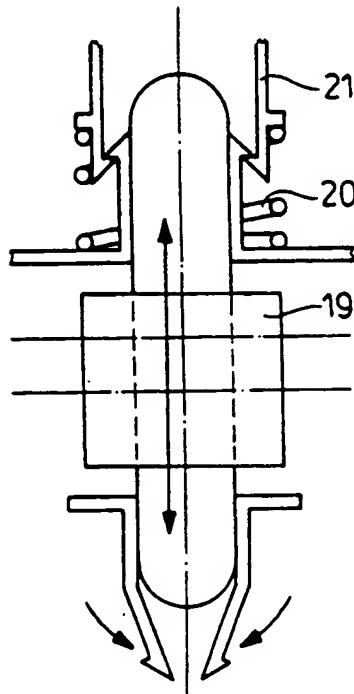
- 2 / 5 -

Fig. 2

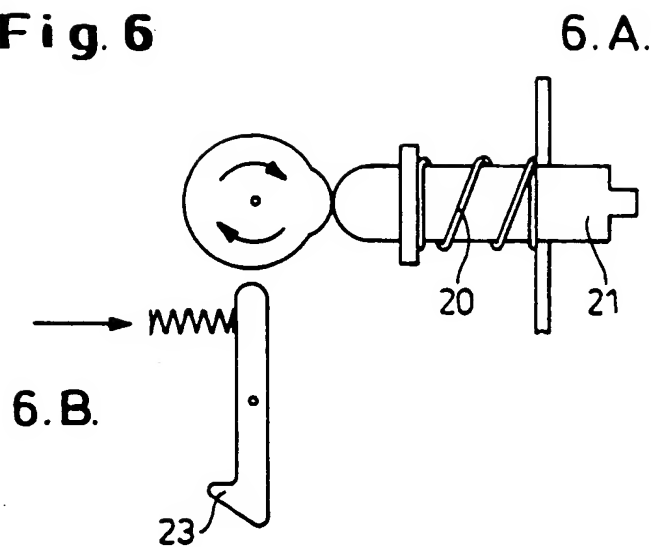
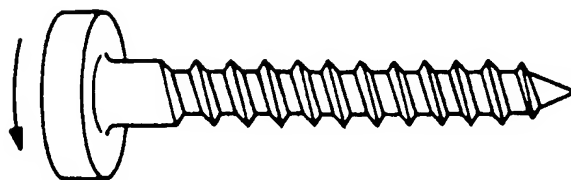
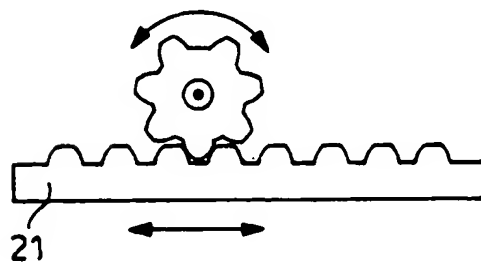
- 3 / 5 -

Fig. 3

- 4 / 5 -

Fig. 4**Fig. 5**

- 5 / 5 -

Fig. 6**6.C.****6.D.**

PCT/US 00/27016

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 D06F39/02 A47L15/44

B. FIELDS SEARCHED

IPC 7 D06F A47L

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

P document published prior to the international filing date but later than the priority date claimed

'8' document member of the same patent family

7 December 2000

15/12/2000

Norman, P

INTERNATIONAL SEARCH REPORT

Intern. Application No

PCT/US 00/27016

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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